National Bureau of Standards
Library, E-01 Admin. Bldg.
JUL 14 1970

UNITED STATES
EPARTMENT OF
OMMERCE
UBLICATION

NBS TECHNICAL NOTE 534

Oceanography: A Bibliography of Selected Activation Analysis Literature

U.S.
EPARTMENT
OF
COMMERCE
National
Bureau
of
Standards

NATIONAL BUREAU OF STANDARDS

The National Bureau of Standards was established by an act of Congress March 3, 1901. Today, in addition to serving as the Nation's central measurement laboratory, the Bureau is a principal focal point in the Federal Government for assuring maximum application of the physical and engineering sciences to the advancement of technology in industry and commerce. To this end the Bureau conducts research and provides central national services in four broad program areas. These are: (1) basic measurements and standards, (2) materials measurements and standards, (3) technological measurements and standards, and (4) transfer of technology.

The Bureau comprises the Institute for Basic Standards, the Institute for Materials Research, the Institute for Applied Technology, the Center for Radiation Research, the Center for Computer Sciences and Technology, and the Office for Information Programs.

THE INSTITUTE FOR BASIC STANDARDS provides the central basis within the United States of a complete and consistent system of physical measurement; coordinates that system with measurement systems of other nations; and furnishes essential services leading to accurate and uniform physical measurements throughout the Nation's scientific community, industry, and commerce. The Institute consists of an Office of Measurement Services and the following technical divisions:

> Applied Mathematics—Electricity—Metrology—Mechanics—Heat—Atomic and Molecular Physics—Radio Physics [2]—Radio Engineering [2]—Time and Frequency [2]—Astrophysics [2]—Cryogenics.[2]

THE INSTITUTE FOR MATERIALS RESEARCH conducts materials research leading to improved methods of measurement standards, and data on the properties of well-characterized materials needed by industry, commerce, educational institutions, and Government; develops, produces, and distributes standard reference materials; relates the physical and chemical properties of materials to their behavior and their interaction with their environments; and provides advisory and research services to other Government agencies. The Institute consists of an Office of Standard Reference Materials and the following divisions:

> Analytical Chemistry—Polymers—Metallurgy—Inorganic Materials—Physical Chemistry.

THE INSTITUTE FOR APPLIED TECHNOLOGY provides technical services to promote the use of available technology and to facilitate technological innovation in industry and Government; cooperates with public and private organizations in the development of technological standards, and test methodologies; and provides advisory and research services for Federal, state, and local government agencies. The Institute consists of the following technical divisions and offices:

> Engineering Standards—Weights and Measures — Invention and Innovation — Vehicle Systems Research—Product Evaluation—Building Research—Instrument Shops—Measurement Engineering—Electronic Technology—Technical Analysis.

THE CENTER FOR RADIATION RESEARCH engages in research, measurement, and application of radiation to the solution of Bureau mission problems and the problems of other agencies and institutions. The Center consists of the following divisions:

> Reactor Radiation—Linac Radiation—Nuclear Radiation—Applied Radiation.

THE CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY conducts research and provides technical services designed to aid Government agencies in the selection, acquisition, and effective use of automatic data processing equipment; and serves as the principal focus for the development of Federal standards for automatic data processing equipment, techniques, and computer languages. The Center consists of the following offices and divisions:

> Information Processing Standards—Computer Information — Computer Services — Systems Development—Information Processing Technology.

THE OFFICE FOR INFORMATION PROGRAMS promotes optimum dissemination and accessibility of scientific information generated within NBS and other agencies of the Federal Government; promotes the development of the National Standard Reference Data System and a system of information analysis centers dealing with the broader aspects of the National Measurement System, and provides appropriate services to ensure that the NBS staff has optimum accessibility to the scientific information of the world. The Office consists of the following organizational units:

> Office of Standard Reference Data—Clearinghouse for Federal Scientific and Technical Information [3]—Office of Technical Information and Publications—Library—Office of Public Information—Office of International Relations.

---

[1] Headquarters and Laboratories at Gaithersburg, Maryland, unless otherwise noted; mailing address Washington, D.C. 20234.

[2] Located at Boulder, Colorado 80302.

[3] Located at 5285 Port Royal Road, Springfield, Virginia 22151.

UNITED STATES DEPARTMENT OF COMMERCE
Maurice H. Stans, Secretary
NATIONAL BUREAU OF STANDARDS • Lewis M. Branscomb, Director

NBS TECHNICAL NOTE 534

ISSUED JUNE 1970
Nat. Bur. Stand. (U.S.), Tech. Note 534, 36 pages (June 1970)
CODEN: NBTNA

Oceanography: A Bibliography of Selected Activation Analysis Literature

G. J. Lutz, Editor

Analytical Chemistry Division
Institute for Materials Research
National Bureau of Standards
Washington, D.C. 20234

NBS Technical Notes are designed to supplement the Bureau's regular publications program. They provide a means for making available scientific data that are of transient or limited interest. Technical Notes may be listed or referred to in the open literature.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.
(Order by SD Catalog No. C13.46:534). Price 50 cents.

OTHER NBS TECHNICAL NOTES IN THIS SERIES

1. Lutz, G. J., Editor. Forensic Science: A Bibliography of Activation Analysis Papers, NBS Technical Note 519, February 1970. 50 cents.*
2. Lutz, G. J., Editor. Determination of the Light Elements in Metals: A Bibliography of Activation Analysis Papers, NBS Technical Note 524, May 1970. 75 cents.*
3. Lutz, G. J., Editor. Pollution Analysis: A Bibliography of the Literature of Activation Analysis. NBS Technical Note 532, June 1970. 45 cents.*
4. Lutz, G. J., Editor. 14-MeV Neutron Generators in Activation Analysis: A Bibliography, NBS Technical Note 533, June 1970. $1.00.*

NBS PUBLICATIONS OF INTEREST TO USERS OF THIS SERIES

1. DeVoe, J. R. and LaFleur, P. D., Editors. Modern Trends in Activation Analysis, Proceedings of the 1968 International Conference on Modern Trends in Activation Analysis, National Bureau of Standards, Gaithersburg, Maryland, October 7-11, 1968. NBS Special Publication 312, Vol. I and II, June 1969. $8.50 per set.*
2. Lutz, G. J., Boreni, R. J., Maddock, R. S. and Meinke, W. W., Editors. Activation Analysis: A Bibliography of Activation Analysis Papers, NBS Technical Note 467 Revised, December 1969. $8.50.*

*Send orders with remittance to: Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Remittance from Foreign countries should include an additional one-fourth of the purchase price for postage.

PREFACE

This bibliography is the fifth of a series of bibliographies on the application of Activation Analysis to specific subjects. The bibliographies in this series are produced from the master files of the Analytical Chemistry Division's Activation Analysis Information Center and will be periodically updated.

W. Wayne Meinke, Chief
Analytical Chemistry Division

OCEANOGRAPHY: A BIBLIOGRAPHY OF SELECTED ACTIVATION ANALYSIS LITERATURE

G. J. Lutz, Editor

The literature of oceanography in activation analysis is reindexed in detail with respect to Element Determined, Matrix Analyzed and Technique Used for precise literature searching. An author index is included.

Key words: Activation analysis; element determined; matrix analyzed; oceanography; technique used.

INTRODUCTION

This publication, Oceanography: A Bibliography of Selected Activation Analysis Literature is one of a series of specialized bibliographies on Activation Analysis, prepared by the Analytical Chemistry Division's Activation Analysis Literature Center.

Publications obtained by the center for inclusion in the Activation Analysis Information and Retrieval Systems are indexed according to the broad categories of Element Determined, Matrix Analyzed and Technique Used. Currently there are 106 descriptive terms under Matrix Analyzed and 53 under Technique Used. Candidates for inclusion in this bibliography were extracted from Matrix Analyzed categories of fish, shellfish, seaweed, marine sediments and seawater. Those publications of interest have been reindexed to more precise and specific literature searching.

An author index has been included. The Center plans to publish revisions to this bibliography as frequently as innovations in the field warrant.

The editors wish to thank Mr. Robert Boreni for his valuable assistance in preparing this bibliography.

OCEANOGRAPHY - ACCESSION NUMBERS

9 EHMANN, W.D.
TRACE ELEMENT DETERMINATIONS IN NATURAL MATERIALS BY ACTIVATION ANALYSIS.
CONF-151-4, (FROM 19TH INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY CONGRESS, LONDON), 22P, (1963), (ENGLISH), UNIVERSITY OF KENTUCKY, LEXINGTON, KENTUCKY.

164 FUKAI, R. * MEINKE, W.W.
TRACE ANALYSIS OF MARINE ORGANISMS A COMPARISON OF ACTIVATION ANALYSIS AND CONVENTIONAL METHODS.
LIMNOLOGY AND OCEANOGRAPHY, 4, 398-408 (1959), (ENGLISH), DEPT. OF CHEMISTRY, UNIV. OF MICHIGAN, ANN ARBOR, MICHIGAN.

165 FUKAI, R. * MEINKE, W.W.
SOME ACTIVATION ANALYSES OF SIX TRACE ELEMENTS IN MARINE BIOLOGICAL ASHES.
NATURE, 184, 815-816 (1959), (ENGLISH), DEPT. OF CHEMISTRY, UNIV. OF MICHIGAN, ANN ARBOR, MICH.

204 DRESSER INDUSTRIES INC.
EQUIPMENT FOR ACTIVATION ANALYSIS OF OCEAN BOTTOM CORES (ENGINEERING MATERIALS).
CAPE-1010, 46 UNITS, UNDATED. (ENGLISH). DRESSER RESEARCH, TULSA, OKLA.

212 SETSER, J.L.
DETERMINATION OF ZIRCONIUM AND HAFNIUM IN METEORITES, SEDIMENTS, AND TERRESTRIAL MATERIALS BY NEUTRON ACTIVATION ANALYSIS.
TID-19179, 81P., 1963. (ENGLISH). KENTUCKY UNIVERSITY, LEXINGTON, KENTUCKY.

235 HUMMEL, R.W.
DETERMINATION OF GOLD IN SEA WATER BY RADIOACTIVATION ANALYSIS.
ANALYST, 82, 483-488 (1957), (ENGLISH), AERE, HARWELL, DIDCOT, BERKS, ENGLAND.

236 HUMMEL, R.W. * SMALES, A.A.
DETERMINATION OF STRONTIUM IN SEA WATER BY USING BOTH RADIOACTIVE AND STABLE ISOTOPES.
ANALYST, 81, 110-113 (1956), (ENGLISH), AERE, HARWELL, DIDCOT, BERKS, ENGLAND.

409 FUKAI, R, * MEINKE, W,W,
ACTIVATION ANALYSES OF VANADIUM, ARSENIC, MOLYBDENUM, TUNGSTEN, RHENIUM, AND GOLD IN MARINE ORGANISMS,
LIMNOLOGY AND OCEANOGRAPHY, 7, 186-200 (1962), (ENGLISH), DEPT, OF CHEM,, UNIV, OF MICHIGAN, ANN ARBOR, MICH,

422 RONA, E, * HOOD, D,W, * AKERS, L,K, * MUSE, L,
DETERMINATION OF MANGANESE IN SEA WATER,
PREPRINT, 9P, (ENGLISH), OAK RIDGE INSTITUTE OF NUCLEAR STUDIES, OAK RIDGE, TENN,

470 SMALES, A,A, * MAPPER, D, * WOOD, A,J,
THE DETERMINATION, BY RADIOACTIVATION, OF SMALL QUANTITIES OF NICKEL, COBALT AND COPPER IN ROCKS, MARINE SEDIMENTS AND METEORITES,
ANALYST, 82, 75-88 (1957), (ENGLISH), ANALYTICAL CHEMISTRY GROUP, AERE, HARWELL, NR, DIDCOT, BERKS, ENGLAND,

471 SMALES, A,A, * MAPPER, D, * WOOD, A,J,
RADIOACTIVATION ANALYSIS OF QUOTE COSMIC QUOTE AND OTHER MAGNETIC SPHERULES,
GEOCHIM, COSMOCHIM, ACTA, 13, 123-126 (1958), (ENGLISH), AERE, HARWELL, ENGLAND,

475 SMALES, A,A, * PATE, B,D,
THE DETERMINATION OF SUB-MICROGRAM QUANTITIES OF ARSENIC BY RADIOACTIVATION, PART II, THE DETERMINATION OF ARSENIC IN SEA-WATER,
ANALYST, 77, 188-195 (1952), (ENGLISH), AERE, HARWELL, ENGLAND,

477 SMALES, A,A, * SALMON, L,
DETERMINATION BY RADIOACTIVATION OF SMALL AMOUNTS OF RUBIDIUM AND CAESIUM IN SEA-WATER AND RELATED MATERIALS OF GEOCHEMICAL INTEREST,
ANALYST, 80, 37-50 (1955), (ENGLISH), AERE, HARWELL, ENGLAND,

492 STEWART, D,C, * BENTLEY, W,C,
ANALYSIS OF URANIUM IN SEA WATER,
SCIENCE, 120, 50-51 (1954), (ENGLISH), ARGONNE NATIONAL LAB,, LEMONT, ILLINOIS,

586 RONA, E. * HOOD, D.W. * MUSE, L. * BUGLIO, B.
ACTIVATION ANALYSIS OF MANGANESE AND ZINC IN SEA WATER.
LIMNOLOGY AND OCEANOGRAPHY, 7, 201-206 (1962).
(ENGLISH), OAK RIDGE INSTITUTE OF NUCLEAR STUDIES,
OAK RIDGE, TENN.

614 SCHUTZ, D.F. * TUREKIAN, K.K.
THE INVESTIGATION OF THE GEOGRAPHICAL AND VERTICAL DISTRIBUTION OF SEVERAL TRACE ELEMENTS IN SEA WATER USING NEUTRON ACTIVATION ANALYSIS.
GEOCHIM. COSMOCHIM. ACTA, 29, 259-313 (1965).
(ENGLISH), DEPARTMENT OF GEOLOGY, YALE UNIVERSITY, NEW HAVEN, CONN.

616 SMALES, A.A. * WISEMAN, J.D.H.
ORIGIN OF NICKEL IN DEEP-SEA SEDIMENTS.
NATURE, 175, 464-465 (1955), (ENGLISH), AERE,
HARWELL, BERKS, ENGLAND.

723 BOWEN, H.J.M.
STRONTIUM AND BARIUM IN SEA WATER AND MARINE ORGANISMS.
J. MAR. BIOL. ASSOC., 35, 451-460 (1956).
(ENGLISH), RADIOBIOLOGICAL RESEARCH UNIT, AERE,
HARWELL, BERKS, ENGLAND.

757 KAMEDA, K.
RADIOACTIVATION ANALYSIS OF RARE-EARTH ELEMENTS IN FISH.
THE THIRD JAPAN CONFERENCE ON RADIOISOTOPES, JRIA 59/P-105, S-5 (1961), (ENGLISH), JAPAN ATOMIC ENERGY RESEARCH INSTITUTE, HEALTH PHYSICS DIVISION.

758 FUKAI, R.
ACTIVATION ANALYSIS OF TRACE ELEMENTS IN MARINE ORGANISMS - ESTIMATIONS OF VANADIUM, ARSENIC, MOLYBDENUM, TUNGSTEN, RHENIUM AND GOLD.
THE THIRD JAPAN CONFERENCE ON RADIOISOTOPES, JRIA 59/P-104, S-4 (1961), (ENGLISH), TOKAI REGIONAL FISHERIES RESEARCH LABORATORY.

961 KEHLER, P. * MONAGHAN, R.
ACTIVATION ANALYSIS OF OCEAN BOTTOM CORES.
TID-18125, 16P., NOVEMBER 1962, (ENGLISH), DRESSER RESEARCH, TULSA, OKLAHOMA.

1094 CARR, M.H. * TUREKIAN, K.K.
THE GEOCHEMISTRY OF COBALT.
GEOCHIM. COSMOCHIM. ACTA, 23, 9-60 (1961).
(ENGLISH). DEPARTMENT OF GEOLOGY, YALE UNIVERSITY,
NEW HAVEN, CONN.

1125 HAMAGUCHI, H. * KAWABUCHI, K. * ONUMA, N.
DETERMINATION OF TRACE QUANTITIES OF TIN BY
NEUTRON ACTIVATION ANALYSIS.
ANAL. CHIM. ACTA, 30, 335-345 (1964). (ENGLISH)
(FRENCH AND GERMAN SUMMARIES). DEPARTMENT OF
CHEMISTRY, TOKYO KYOIKU UNIVERSITY, KOISHIKAWA,
TOKYO, JAPAN.

1127 HAMAGUCHI, H. * KURODA, R. * HOSOHARA, K. *
SHIMIZU, T.
THERMAL NEUTRON ACTIVATION ANALYSIS OF TANTALUM IN
SEA WATER.
J. ATOMIC ENERGY SOC. JAPAN, 5, NO. 8, 662-665
(1963). (JAPANESE) (ENGLISH SUMMARY). DEPT. CHEM.,
FACULTY SCIENCE, TOKYO KYOIKU UNIV., JAPAN.

1128 HAMAGUCHI, H. * KURODA, R. * WATANABE, Y.
TANTALUM CONTENTS OF DEEP SEA SEDIMENTS.
NIPPON KAGAKU ZASSHI, 84, 723-726 (1963).
(JAPANESE) (ENGLISH SUMMARY). DEPARTMENT OF
CHEMISTRY, TOKYO KYOIKU UNIVERSITY, BUNKYO-KU,
TOKYO, JAPAN.

1257 KAMEDA, K.
STUDY ON ABUNDANCE OF RARE EARTH ELEMENTS IN
MARINE ORGANISMS.
J. RADIATION RES. (JAPAN), 3, 89-103 (JUNE 1962).
(ENGLISH). JAPAN ATOMIC ENERGY RESEARCH INSTITUTE,
TOKAI, IBARAGI PREF., JAPAN

1277 GIRARDI, F. * MERLINI, M.
STUDIES ON THE DISTRIBUTION OF TRACE ELEMENTS IN A
MOLLUSK FROM A FRESHWATER ENVIRONMENT BY
ACTIVATION ANALYSIS.
L ANALYSE PAR RADIOACTIVATION ET SES APPLICATIONS
AUX SCIENCES BIOLOGIQUES. PRESSES UNIVERSITAIRES
DE FRANCE, 108, BLVD. SAINT-GERMAIN, PARIS, 6E,
23-46 (1964). (ENGLISH). NUCLEAR CHEMISTRY AND
BIOLOGY, ISPRA, ITALY.

1385 HAMAGUCHI, H, * KURODA, R, * ONUMA, N, *
KAWABUCHI, K, * MITSUBAYASHI, T, * HOSOHARA, K,
THE GEOCHEMISTRY OF TIN,
GEOCHIM, COSMOCHIM, ACTA, 28, 1039-1053 (1964),
(ENGLISH), DEPARTMENT OF CHEMISTRY, TOKYO KYOIKU
UNIVERSITY, TOKYO, OTSUKA, JAPAN,

1395 HORI, R,
STUDIES ON THE PERMEABILITY OF SEA URCHIN PLASMA
MEMBRANE BY NEUTRON ACTIVATION ANALYSIS,
RADIOISOTOPES (TOKYO), 12, 115-119 (1963),
(JAPANESE), TOYAMA UNIVERSITY, JAPAN,

1401 WAKITA, H, * KIGOSHI, K,
ACTIVATION ANALYSIS OF THORIUM IN SHELLS,
NIPPON KAGAKU ZASSHI, 85, 476-480 (1964),
(JAPANESE), GAKUSHUIN UNIVERSITY, TOKYO, JAPAN,

1402 OKA, Y, * KATO, T, * SASAKI, M,
DETERMINATION OF GOLD IN SEA WATER BY NEUTRON
ACTIVATION ANALYSIS,
NIPPON KAGAKU ZASSHI, 85, 643-647 (1964),
(JAPANESE) (ENGLISH SUMMARY), TOHOKU UNIVERSITY,
SENDAI, JAPAN,

1457 CORLESS, J.T, * WINCHESTER, J,W,
VARIATIONS IN THE RATIO CA-48/(TOTAL CA) IN THE
NATURAL ENVIRONMENT,
PURE AND APPL, CHEM,, 8, NO, 3-4, 317-323 (1964),
(ENGLISH), MIT, CAMBRIDGE, MASS,

1688 TUREKIAN, K,K,
ANNUAL PROGRESS REPORT, DECEMBER 1, 1963-NOVEMBER
30, 1964, GEOCHEMISTRY TECHNICAL REPORT 10,
TID-21137, 30P,, AUGUST 31, 1964, (ENGLISH),
DEPARTMENT OF GEOLOGY, YALE UNIVERSITY, NEW HAVEN,
CONN,

1727 MULLINS, W.T, * EMERY, J.F, * BATE, L.C, *
LEDDICOTTE, G,W,
APPLICATIONS OF NEUTRON-ACTIVATION ANALYSIS IN
OCEANOGRAPHY,
ORNL-3397, 105-106 (1963), (ENGLISH), OAK RIDGE
NATIONAL LABORATORY, OAK RIDGE, TENN,

1781 MERLINI, M.
THE USE OF RADIOACTIVATION ANALYSIS IN BIOLOGY.
EUR-128.I, 27P., 1962, (ITALIAN) (ENGLISH
SUMMARY), EUROPEAN ATOMIC ENERGY COMMUNITY,
NUCLEAR RESEARCH CENTER, ISPRA, ITALY.

1874 WINCHESTER, J.W. * DUCE, R.A.
HALOGEN GEOCHEMISTRY.
TECH. ENG. NEWS, 27-31 (MAY 1965), (ENGLISH),
DEPARTMENT OF GEOPHYSICS, MIT, CAMBRIDGE, MASS.

1945 HOGDAHL, O.T.
DISTRIBUTION OF THE RARE EARTH ELEMENTS IN
SEA-WATER.
NATO RESEARCH GRANT NO. 203, SEMIANNUAL PROGRESS
REPORT NO. 2, OCTOBER 1, 1965 TO MARCH 31, 1966,
43P., 7 FIGURES, APRIL 30, 1966, (ENGLISH),
CENTRAL INSTITUTE FOR INDUSTRIAL RESEARCH, OSLO,
BLINDERN, NORWAY.

1970 MIRO, M. * DE PADOVANI, I.O. * RAMOS, E. *
DE VEGA, V.R. * LOWMAN, F.G.
THE DETERMINATION OF STABLE SCANDIUM IN PLANTS,
ANIMALS, SEDIMENTS, SANDS, SOILS, ROCKS AND
MINERALS BY NEUTRON ACTIVATION ANALYSIS.
ANAL. CHIM. ACTA, 35, NO. 1, 54-60 (1966),
(ENGLISH) (FRENCH AND GERMAN SUMMARIES), PUERTO
RICO NUCLEAR CENTER, MAYAGUEZ, PUERTO RICO.

2546 KEISCH, B. * KOCH, R.C. * LEVINE, A.S.
DETERMINATION OF BIOSPHERIC LEVELS OF I-129 BY
NEUTRON-ACTIVATION ANALYSIS.
PROCEEDINGS 1965 INTERNATIONAL CONFERENCE, MODERN
TRENDS IN ACTIVATION ANALYSIS, COLLEGE STATION,
TEXAS, 284-290, APRIL 19-22, 1965, (ENGLISH),
NUCLEAR SCIENCE AND ENGINEERING CORPORATION,
PITTSBURGH, PA.

2732 STEVENSON, R.A. * UFRET, S.L. * DIECIDUE, A.T.
TRACE ELEMENT ANALYSES OF SOME MARINE ORGANISMS.
FIFTH INTER-AMERICAN SYMPOSIUM ON THE PEACEFUL
APPLICATION OF NUCLEAR ENERGY, WASHINGTON, D.C.,
PAN AMERICAN UNION, 233-239, 1965, (ENGLISH),
PUERTO RICO NUCLEAR CENTER, MAYAGUEZ, PUERTO RICO.

OCEANOGRAPHY - ACCESSION NUMBERS

2848 SLOWEY, J.F. * HEDGES, D.H. * HOOD, D.W.
THE CHEMISTRY AND ANALYSIS OF TRACE METALS IN SEA
WATER. PROGRESS REPORT NO. 2, AUGUST 1,
1961-NOVEMBER 1, 1962.
TID-22660, 70P., OCTOBER 31, 1962. (ENGLISH).
DEPARTMENT OF OCEANOGRAPHY AND METEOROLOGY, TEXAS
A AND M, COLLEGE STATION, TEXAS.

2973 HORI, R.
THE ACTIVATION ANALYSIS OF SODIUM AND POTASSIUM IN
BIOLOGICAL MATERIAL.
RADIOISOTOPE SAMPLE MEASUREMENT TECHNIQUES IN
MEDICINE AND BIOLOGY. IAEA, VIENNA, 259-264,
1965. (ENGLISH) (FRENCH, RUSSIAN AND SPANISH
SUMMARIES). BIOLOGICAL INSTITUTE, TOYAMA
UNIVERSITY, TOYAMA, JAPAN.

2984 RAO, S.R. * KHAN, A.A. * KAMATH, P.R.
STABLE STRONTIUM IN SEA WATER BY ACTIVATION
TECHNIQUE.
PROCEEDINGS OF THE NUCLEAR AND RADIATION CHEMISTRY
SYMPOSIUM, 1964. TROMBAY, INDIA, ATOMIC ENERGY
ESTABLISHMENT, 199-204, 1965. (ENGLISH). HEALTH
PHYSICS DIVISION, ATOMIC ENERGY ESTABLISHMENT
TROMBAY, BOMBAY, INDIA.

3960 TUREKIAN, K.K. * JOHNSON, D.G.
THE BARIUM DISTRIBUTION IN SEA WATER
GEOCHIM. COSMOCHIM. ACTA, 30, 1153-1174 (NOV.
1966). (ENGLISH). DEPARTMENT OF GEOLOGY, YALE
UNIVERSITY, NEW HAVEN, CONNECTICUT.

3969 TUREKIAN, K.K.
TRACE ELEMENTS IN SEA WATER AND OTHER NATURAL
WATERS.
YALE-2912-12, 60P., AUGUST 31, 1966. (ENGLISH).
YALE UNIVERSITY, DEPARTMENT OF GEOLOGY.

4219 HAYES, D.W. * SLOWEY, J.F. * HOOD, D.W.
RARE EARTH DISTRIBUTION IN WATERS OF GULF OF
MEXICO.
TID-23295, SECT. 4,112P., UNDATED. (ENGLISH).
USA.

4244 CAPPADONA, C,
ACTIVATION ANALYSIS, RAPID DETERMINATION OF GOLD IN SEAWATER,
ATTI ACCAD, SCI, LETTERE ARTI PALERMO, PT, 1, 24, 71=74 (1963/64), (ITALIAN) (ENGLISH AND FRENCH SUMMARIES), ISTITUTO DI APPLICAZIONI E IMPIANTI NUCLEARI DELL UNIVERSITA DI PALERMO, ITALY,

4255 DIXON, B.W, * SLOWEY, J.F, * HOOD, D.W,
NEUTRON ACTIVATION ANALYSIS OF RUTHENIUM IN SEA WATER,
TID=23295, SECT, 3, 22P, UNDATED, (ENGLISH), TEXAS A AND M UNIVERSITY, COLLEGE STATION, TEXAS,

4291 SLOWEY, J.F,
STUDIES ON THE DISTRIBUTION OF COPPER, MANGANESE AND ZINC IN THE OCEAN USING NEUTRON ACTIVATION ANALYSIS,
TID=23295, SECT, 2, 113P,, UNDATED, (ENGLISH), USA,

4381 ROBERTSON, D,E, * PERKINS, R,W,
TRACE ELEMENTS AND CS=137 IN SEA WATER BY GAMMA=RAY SPECTROMETRIC TECHNIQUES,
BNWL=SA=674, 10P,, AUGUST 31, 1966, (ENGLISH), USA,

5359 HOGDAHL, O,T,
DISTRIBUTION OF THE RARE EARTH ELEMENTS IN SEA WATER,
NATO RESEARCH GRANT NO, 203 SEMIANNUAL PROGRESS REPORT NO, 4, OCTOBER 1, 1966 TO MARCH 31, 1967, 34P,, 11 FIGURES, APRIL 29, 1967, (ENGLISH), OSLO, BLINDERN, NORWAY,

5387 LOWMAN, F,G,
APPLICATIONS OF NUCLEAR SPECTROSCOPY,
I CONFERENCIA DE ESPECTROSCOPIA NUCLEAR Y FISICA DEL ESTADO SOLIDO, 49=52 (1964), (ENGLISH), PUERTO RICO NUCLEAR CENTER, MAYAGUEZ, PUERTO RICO,

5726 FURUHASHI, N, * UEMURA, T,
QUANTITATIVE ACTIVATION ANALYSIS OF THE IMPURITIES IN A CULTURE PEARL,
OSAKA FURITSU KOGYO=SHOREIKAN HOKOKU, NO, 39, 46=49 (JULY 1966), (JAPANESE) (ENGLISH SUMMARY), INDUSTRIAL RESEARCH INSTITUTE OF OSAKA PREFECTURE, JAPAN,

5746 BABB, A.L. * MILLER, W.P. * WILSON, W.E., JR. *
WOODRUFF, G.L. * NOVOTNY, A.J.
NEUTRON ACTIVATION ANALYSIS OF STABLE DYSPROSIUM
BIOLOGICALLY DEPOSITED IN THE BONE OF CHINOOK
SALMON FINGERLINGS.
TRANS. AMER. NUCL. SOC., 10, 449 (NOVEMBER 1967).
(ENGLISH). UNIVERSITY OF WASHINGTON AND U.S.
BUREAU COMMERCIAL FISHERIES.

5771 LANDSTROM, O. * SAMSAHL, K. * WENNER, C.G.
AN INVESTIGATION OF TRACE ELEMENTS IN MARINE AND
LACUSTRINE DEPOSITS BY MEANS OF A NEUTRON
ACTIVATION METHOD.
AE-296, 40P., OCTOBER 1967. (ENGLISH).
AKTIEBOLAGET ATOMENERGI, STOCKHOLM, SWEDEN.

5776 SHIGEMATSU, T. * FUJINO, O. * HONJO, T.
NON-DESTRUCTIVE DETERMINATION OF SILICON (SILICA)
IN MARINE SEDIMENTS BY FAST NEUTRON ACTIVATION.
BULL. INST. CHEM. RES., KYOTO UNIV., 45, NO. 4-5,
299-306 (1967). (ENGLISH). SHIGEMATSU
LABORATORY, JAPAN.

5777 SHIGEMATSU, T. * TABUSHI, M. * AOKI, T. * FUJINO, O.
* NISHIKAWA, Y. * GODA, S.
ACTIVATION ANALYSIS OF LANTHANUM AND EUROPIUM IN
SEA WATER AND LAKE WATER.
BULL. INST. CHEM. RES., KYOTO UNIV., 45, NO. 4-5,
307-317 (1967). (ENGLISH). SHIGEMATSU
LABORATORY, JAPAN.

5873 HOGDAHL, O.T.
DISTRIBUTION OF THE RARE EARTH ELEMENTS IN SEA
WATER.
NATO RESEARCH GRANT NO. 203, SEMIANNUAL PROGRESS
REPORT NO. 5, 1-25, APRIL 1, 1967 TO SEPT. 30,
1967. (ENGLISH). CENTRAL INSTITUTE FOR
INDUSTRIAL RESEARCH, OSLO, BLINDERN, NORWAY.

6023 LUNDE, G.
ACTIVATION ANALYSIS OF BROMINE, IODINE AND ARSENIC
IN OILS FROM FISHES, WHALES, PHYTO- AND
ZOOPLANKTON OF MARINE AND LIMNETIC BIOTOPES.
INT. REV. GESAM. HYDROBIOL., 52, 265-279 (1967).
(ENGLISH). CENTRAL INSTITUTE FOR INDUSTRIAL
RESEARCH, OSLO, NORWAY.

6208 BENNETT, J.H. * MANUEL, O.K.,
IODINE ABUNDANCES IN DEEP-SEA SEDIMENTS,
J, GEOPHYS, RES,, 73, 2302-2303 (MARCH 15, 1968),
(ENGLISH), CHEMISTRY DEPARTMENT, UNIVERSITY OF
MISSOURI, ROLLA, MISSOURI,

6228 HOGDAHL, O.T.,
DISTRIBUTION OF THE RARE EARTH ELEMENTS IN SEA
WATER,
NATO RESEARCH GRANT NO, 203, SEMIANNUAL PROGRESS
REPORT NO, 6, OCTOBER 1, 1967 TO MARCH 31, 1968,
23P,, APRIL 30, 1968, (ENGLISH), CENTRAL
INSTITUTE FOR INDUSTRIAL RESEARCH, OSLO, BLINDERN,
NORWAY,

6348 DOSHI, G.R.,
ALKALINE EARTH PHOSPHATE AS CARRIER FOR THE
DETERMINATION OF TRACE ELEMENTS IN SEAWATER,
INDIAN J. CHEM,, 5, 580-581 (NOVEMBER 1967),
(ENGLISH), HEALTH PHYSICS DIVISION, BHABHA ATOMIC
RESEARCH CENTRE TROMBAY, BOMBAY, INDIA,

6375 ROBERTSON, D.E, * RANCITELLI, L.A, * PERKINS, R.W,
MULTIELEMENT ANALYSIS OF SEAWATER, MARINE
ORGANISMS AND SEDIMENTS BY NEUTRON ACTIVATION
WITHOUT CHEMICAL SEPARATIONS,
BNWL-SA-1776, 74P,, MAY 15, 1968, (ENGLISH),
BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST
LABORATORY, RICHLAND, WASHINGTON,

6455 LIVINGSTON, H.D. * BOWEN, V.T.,
ACTIVATION ANALYSIS OF LANTHANIDE ELEMENTS IN
MODERN CORALS, GERMANIUM DETECTOR PROCEDURES,
NYO-2174-70, 18P,, APRIL 1968, (ENGLISH), WOODS
HOLE OCEANOGRAPHIC INSTITUTION, WOODS HOLE,
MASSACHUSETTS,

6823 TUREKIAN, K.K,
TRACE ELEMENTS IN NATURAL WATERS,
YALE-2912-20, 31P,, AUGUST 31, 1968, (ENGLISH),
DEPARTMENT OF GEOLOGY AND GEOPHYSICS, YALE
UNIVERSITY, NEW HAVEN, CONNECTICUT,

6843 WILKNISS, P.E, * LINNENBOM, V.J,
THE DETERMINATION OF FLUORINE IN SEAWATER BY
PHOTON ACTIVATION ANALYSIS,
LIMNOL, OCEANOGR,, 13, NO, 3, 530-533 (JULY 1968),
(ENGLISH), NAVAL RESEARCH LABORATORY,
WASHINGTON, D.C,

6924 DE GROOT, A.J. * ZSCHUPPE, K.H. * DE BRUIN, M. * HOUTMAN, J.P.W. * AMIN SINGGIH, P.
ACTIVATION ANALYSIS APPLIED TO SEDIMENTS FROM VARIOUS RIVER DELTAS.
NBS SPEC. PUBL. 312, VOL. I. MODERN TRENDS IN ACTIVATION ANALYSIS, 62-71, JUNE 1969. (ENGLISH). INSTITUTE FOR SOIL FERTILITY, HAREN-GRONINGEN, REACTOR INSTITUTE, DELFT, NETHERLANDS, AND ATOMIC REACTOR CENTRE, BANDUNG, INDONESIA.

6936 GORDON, C.M. * LARSON, R.E.
NEUTRON ACTIVATION ANALYSIS OF BARNACLE SHELLS.
NBS SPEC. PUBL. 312, VOL. I. MODERN TRENDS IN ACTIVATION ANALYSIS, 142-146, JUNE 1969. (ENGLISH). NAVAL RESEARCH LABORATORY, WASHINGTON, D.C.

6965 LANDSTROM, O. * SAMSAHL, K. * WENNER, C.G.
AN INVESTIGATION OF TRACE ELEMENTS IN MARINE AND LACUSTRINE DEPOSITS BY MEANS OF A NEUTRON ACTIVATION METHOD.
NBS SPEC. PUBL. 312, VOL. I. MODERN TRENDS IN ACTIVATION ANALYSIS, 353-366, JUNE 1969. (ENGLISH). AB ATOMENERGI, STOCKHOLM, AND DEPARTMENT OF QUATERNARY RESEARCH, UNIVERSITY OF STOCKHOLM, STOCKHOLM, SWEDEN.

6969 MILLARD, H.T., JR.
NEUTRON ACTIVATION ANALYSIS OF INDIVIDUAL COSMIC SPHERULES.
NBS SPEC. PUBL. 312, VOL. I. MODERN TRENDS IN ACTIVATION ANALYSIS, 395-398, JUNE 1969. (ENGLISH). U.S. GEOLOGICAL SURVEY, DENVER, COLORADO.

6982 MERLINI, M. * RAVERA, O. * BIGLIOCCA, C.
NONDESTRUCTIVE DETERMINATION OF ELEMENTS IN SPECIFIC FRESHWATER MICROPLANKTON BY ACTIVATION ANALYSIS.
NBS SPEC. PUBL. 312, VOL. I. MODERN TRENDS IN ACTIVATION ANALYSIS, 475-481, JUNE 1969. (ENGLISH). EURATOM JOINT RESEARCH CENTER, ISPRA, ITALY.

7095 BOWEN, H.J.M.
THE UPTAKE OF GOLD BY MARINE SPONGES.
J. MAR. BIOL. ASSN. U.K., 48, 275-277 (JUNE 1968). (ENGLISH). CHEMISTRY DEPARTMENT, UNIVERSITY OF READING, BERKS.

7294 ODA, T.
DETERMINATION OF RARE EARTH ELEMENTS IN HOT SPRING WATER BY RADIOACTIVATION METHOD,
RADIOISOTOPES (TOKYO), 18, 39-43 (FEBRUARY 1969), (JAPANESE) (ENGLISH SUMMARY), THE INSTITUTE OF BALNEOTHERAPEUTICS, KYUSHU UNIVERSITY, JAPAN.

7921 NEUBERGER, M, * FOURCY, A,
STUDY OF THE RUTHENIUM PARTITION IN AN ECOLOGICAL POND USING NEUTRON ACTIVATION ANALYSIS,
INTERN, J, APPL, RADIATION ISOTOPES, 20, NO, 9, 641-651 (1969), (FRENCH) (ENGLISH, RUSSIAN AND GERMAN SUMMARIES), LABORATOIRE DE BIOLOGIE VEGETABLE, CENTRE D ETUDES NUCLEAIRES DE GRENOBLE, COMMISSARIAT A L ENERGIE ATOMIQUE, GRENOBLE, FRANCE.

7935 PIPER, D.Z. * GOLES, G.G.
DETERMINATION OF TRACE ELEMENTS IN SEAWATER BY NEUTRON ACTIVATION ANALYSIS,
ANAL, CHIM, ACTA, 47, NO, 3, 560-563 (1969), (ENGLISH), SCRIPPS INSTITUTION OF OCEANOGRAPHY AND UNIVERSITY OF CALIFORNIA, LA JOLLA, CALIF.

7975 FISHER, D.E. * BOSTROM, K,
URANIUM RICH SEDIMENTS ON THE EAST PACIFIC RISE,
NATURE, 224, NO, 5214, 64-65 (OCTOBER 4, 1969), (ENGLISH), INSTITUTE OF MARINE NCIENCES, UNIVERSITY OF MIAMI, MIAMI, FLORIDA,

8018 WIGGINS, P.F. * SENFTLE, F.E. * DUFFEY, D,
CALIFORNIUM-252 AS A NEUTRON SOURCE FOR MARINE EXPLORATION,
TRANS, AMER, NUCL, SOC., 12, NO, 2, 492 (NOVEMBER 1969), (ENGLISH), U.S, NAVAL ACADEMY, U.S, GEOLOGICAL SURVEY AND UNIVERSITY OF MARYLAND,

8074 GOLDBERG, E.D. * KOIDE, M, * SCHMITT, R.A. * SMITH, R.H.
RARE EARTH DISTRIBUTIONS IN THE MARINE ENVIRONMENT,
J, GEOPHYS, RES., 68, NO, 14, 4209-4217 (JULY 15, 1963), (ENGLISH), UNIVERSITY OF CALIFORNIA AT SAN DIEGO, LA JOLLA AND GENERAL ATOMIC DIVISION, SAN DIEGO, CALIF,

8140 ROBERTSON, D.E. * PROSPERO, J.M.
TRACE ELEMENT CONCENTRATIONS IN ATLANTIC OCEAN WATERS BETWEEN FLORIDA AND IVORY COAST, AFRICA.
BNWL-1051 (PART 2), 53-58, JUNE 1969. (ENGLISH).
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON.

8141 ROBERTSON, D.E.
THE DISTRIBUTION OF SIXTEEN TRACE ELEMENTS IN PELAGIC SEDIMENT CORES FROM THE SOUTH PACIFIC OCEAN.
BNWL-1051 (PART 2), 59-63, JUNE 1969. (ENGLISH).
BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON.

8146 RANCITELLI, L.A. * TANNER, T.M. * DEAN, J.M.
THE ELEMENTAL CONTENT AND RETENTION OF A RAINBOW TROUT.
BNWL-1051 (PART 2), 142-146, JUNE 1969.
(ENGLISH). BATTELLE NORTHWERT, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON.

8147 RANCITELLI, L.A.
THE MULTIELEMENT ANALYSIS OF PACIFIC SALMON TISSUE.
BNWL-1051 (PART 2), 146-151, JUNE 1969.
(ENGLISH). BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON.

8148 RANCITELLI, L.A. * TEMPLETON, W.L. * DEAN, J.M.
THE TRACE ELEMENT CONTENT OF AQUATIC ORGANISMS FROM PANAMA AND COLOMBIA.
BNWL-1051 (PART 2), 152-155, JUNE 1969.
(ENGLISH). BATTELLE NORTHWEST, PACIFIC NORTHWEST LABORATORY, RICHLAND, WASHINGTON.

8196 LIVINGSTON, H.D. * THOMPSON, G.
TRACE ELEMENT CONCENTRATIONS IN SOME MODERN CORALS.
NYO-2174-96, 28P., MAY 1969. (ENGLISH). WOODS HOLE OCEANOGRAPHIC INSTITUTION, WOODS HOLE, MASSACHUSETTS.

APPENDIX I

OCEANOGRAPHY - AUTHOR INDEX

AKERS, L.K. 422
AMIN SINGGIH, P. 6924
AOKI, T. 5777

BABB, A.L. 5746
BATE, L.C. 1727
BENNETT, J.H. 6208
BENTLEY, W.C. 492
BIGLIOCCA, C. 6982
BOSTROM, K. 7975
BOWEN, H.J.M. 723 7095
BOWEN, V.T. 6455
BUGLIO, B. 586

CAPPADONA, C. 4244
CARR, M.H. 1094
CORLESS, J.T. 1457

DE BRUIN, M. 6924
DE GROOT, A.J. 6024
DE PADOVANI, I.O. 1970
DE VEGA, V.R. 1970
DEAN, J.M. 8146 8148
DIECIDUE, A.T. 2732
DIXON, B.W. 4255
DOSHI, G.R. 6348
DRESSER INDUSTRIES INC. 204
DUCE, R.A. 1874
DUFFEY, D. 8018

EHMANN, W.D. 9
EMERY, J.F. 1727

FISHER, D.E. 7975
FOURCY, A. 7921
FUJINO, O. 5776 5777
FUKAI, R. 164 165 409 758
FURUHASHI, N. 5726

GIRARDI, F. 1277
GODA, S. 5777
GOLDBERG, E.D. 8074
GOLES, G.G. 7935
GORDON, C.M. 6936

HAMAGUCHI, H. 1125 1127 1128 1385
HAYES, D.W. 4219
HEDGES, D.H. 2848
HOGDAHL, O.T. 1945 5359 5873 6228
HONJO, T. 5776
HOOD, D.W. 422 586 2848 4219 4255
HORI, R. 1395 2973
HOSOHARA, K. 1127 1385
HOUTMAN, J.P.W. 6924
HUMMEL, R.W. 235 236

JOHNSON, D.G. 3960

KAMATH, P.R. 2984
KAMEDA, K. 757 1257
KATO, T. 1402
KAWABUCHI, K. 1125 1385
KEHLER, P. 961
KEISCH, B. 2546
KHAN, A.A. 2984
KIGOSHI, K. 1401

OCEANOGRAPHY - AUTHOR INDEX

KOCH, R.C. 2546
KOIDE, M. 8074
KURODA, R. 1127 1128 1385

LANDSTROM, O. 5771 6965
LARSON, R.E. 6936
LEDDICOTTE, G.W. 1727
LEVINE, A.S. 2546
LINNENBOM, V.J. 6843
LIVINGSTON, H.D. 6455 8196
LOWMAN, F.G. 1970 5387
LUNDE, G. 6023

MANUEL, O.K. 6208
MAPPER, D. 470 471
MEINKE, W.W. 164 165 409
MERLINI, M. 1277 1781 6982
MILLARD, H.T., JR. 6969
MILLER, W.P. 5746
MIRO, M. 1970
MITSUBAYASHI, T. 1385
MONAGHAN, R. 961
MULLINS, W.T. 1727
MUSE, L. 422 586

NEUBERGER, M. 7921
NISHIKAWA, Y. 5777
NOVOTNY, A.J. 5746

ODA, T. 7294
OKA, Y. 1402
ONUMA, N. 1125 1385

PATE, B.D. 475
PERKINS, R.W. 4381 6375
PIPER, D.Z. 7935
PROSPERO, J.M. 8140

RAMOS, E. 1970
RANCITELLI, L.A. 6375 8146 8147 8148
RAO, S.R. 2984
RAVERA, O. 6982
ROBERTSON, D.E. 4381 6375 8140 8141
RONA, E. 422 586

SALMON, L. 477
SAMSAHL, K. 5771 6965
SASAKI, M. 1402
SCHMITT, R.A. 8074
SCHUTZ, D.F. 614
SENFTLE, F.E. 8018
SETSER, J.L. 212
SHIGEMATSU, T. 5776 5777
SHIMIZU, T. 1127
SLOWEY, J.F. 2848 4219 4255 4291
SMALES, A.A. 236 470 471 475 477 616
SMITH, R.H. 8074
STEVENSON, R.A. 2732
STEWART, D.C. 492

TABUSHI, M. 5777
TANNER, T.M. 8146
TEMPLETON, W.L. 8148
THOMPSON, G. 8196
TUREKIAN, K.K. 614 1094 1688 3960 3969 6823

OCEANOGRAPHY - AUTHOR INDEX

UEMURA, T. 5726
UFRET, S.L. 2732

WAKITA, H. 1401
WATANABE, Y. 1128
WENNER, C.G. 5771 6965
WIGGINS, P.F. 8018
WILKNISS, P.E. 6843
WILSON, W.E., JR. 5746
WINCHESTER, J.W. 1457 1874
WISEMAN, J.D.H. 616
WOOD, A.J. 470 471
WOODRUFF, G.L. 5746

ZSCHUPPE, K.H. 6924

APPENDIX II

Element Determined

OCEANOGRAPHY - ELEMENT DETERMINED

ALUMINUM

961

ANTIMONY

614 4381 5771 6375 6965 7935 8140 8141 8146 8147 8148

ARSENIC

165 409 475 758 1727 5771 6023 6924 6965

BARIUM

614 723 1727 3960

BROMINE

5771 6023 6375 6965 8146 8147 8148

CADMIUM

1277

CALCIUM

3969 5771 6936 6965 6982 8196

CALCIUM-48

1457

CERIUM

5771 6965 8141 8196

CESIUM

477 614 1727 4381 5771 6375 6965 7935 8140 8146 8147 8148

CHROMIUM

614 1277 5771 6823 6924 6965 7935 8141 8146 8147 8148 8196

COBALT

470 471 614 1094 1277 1688 1727 3969 4381 5771 6348 6375
6965 6969 7935 8140 8141 8146 8147 8148 8196

COPPER

470 471 1688 2848 4291 6375 6924 8141

DYSPROSIUM

757 5746

EUROPIUM

5771 5777 6965 8141 8196

FLUORINE

6843

GALLIUM

5771 6965

GOLD

165 235 409 614 758 1277 1402 1727 4244 7095

HAFNIUM

9 212 614 5771 6965 8141

INDIUM

1727

IODINE

6023 6208

IODINE-129

2546

IRIDIUM

9 1727 6969

IRON

614 961 1277 5771 6375 6965 6969 7935 8140 8141 8146 8147 8148 8196

OCEANOGRAPHY - ELEMENT DETERMINED

LANTHANUM

5771 5777 6375 6924 6965 8141 8196

LUTETIUM

5771 6965

MAGNESIUM

961 6936

MANGANESE

422 586 1277 1781 2848 4291 5726 5771 6375 6924 6936 6965
6969 6982 8141

MERCURY

614 1277 5771 6375 6965 8146 8147 8148

MOLYBDENUM

165 409 758 1727 6823

NICKEL

470 471 614 616 1688 1727 6969

POTASSIUM

1395 2973 6375 6982 8146 8147 8148

RHENIUM

165 409 758 1727

RUBIDIUM

477 614 1727 5771 6375 6965 7935 8146 8147 8148

RUTHENIUM

4255 7921

SAMARIUM

5771 6924 6965

SCANDIUM

614 1277 1727 1970 2732 4381 5771 6375 6924 6965 7935 8140 8141 8146 8147 8148 8196

SELENIUM

614 5771 6375 6965 8146 8147 8148

SILICON

961 5776

SILVER

614 1277 1688 3969 8146 8147 8148

SODIUM

961 1395 2973 5726 5771 6375 6936 6965 6982 8141 8146 8147 8148

STRONTIUM

236 614 723 1277 1727 2984 5771 6375 6936 6965 7935 8140 8141

TANTALUM

9 614 1127 1128 5771 6965

TERBIUM

5771 6965

THORIUM

1277 1401 5771 6965 8141

TIN

1125 1385

TUNGSTEN

165 409 758 1727 5771 6965

OCEANOGRAPHY - ELEMENT DETERMINED

URANIUM

492 1727 3969 4381 5771 6375 6965 7975 8140 8196

VANADIUM

165 409 758 1727

YTTERBIUM

8141

ZINC

586 614 1277 2848 4291 6348 6375 6924 7935 8140 8146 8147
8148 8196

ZIRCONIUM

9 212 614

RARE EARTHS

1257 1945 4219 5359 5873 6228 6455 7294 8074

APPENDIX III

OCEANOGRAPHY - MATRIX ANALYZED

ALGAE

723 2732

CORAL

723 3969 6455 8196

CRUSTACEANS

164 165 409 1781 6936

FISH

164 165 409 757 1257 5746 6023 6375 8146 8147 8148

MARINE ORGANISMS, GENERAL

758 1727 6375 7921

MARINE SEDIMENTS

9 212 470 471 477 616 1094 1128 1385 1457 1727 1970 5771
5776 5873 6208 6375 6823 6924 6965 6969 7975 8141

MOLLUSKS

164 165 409 723 1277 1401 1457

PEARL
5726

PLANKTON

6023 6982

SEA-URCHIN EGGS

1395 2973

SEAWEED

164 165 409 477 1257 2546

OCEANOGRAPHY - MATRIX ANALYZED

SEAWATER

164 235 236 422 475 477 492 586 614 723 1125 1127 1385 1402
1457 1688 1727 1945 2848 2984 3960 4219 4244 4255 4291 4381
5359 5777 5873 6228 6348 6375 6823 6843 7294 7935 8074 8140

SPONGE

7095

APPENDIX IV

OCEANOGRAPHY - TECHNIQUE USED

COMPARISON OF SENSITIVITIES WITH OTHER METHODS

164

DESCRIPTION OF RADIOCHEMICAL SEPARATION

9 212 235 236 409 422 470 475 586 614 1257 1277 1401 1945
3969 4244 5777 6023 6823

DETAILED DATA ON TRACE ELEMENT LEVELS

164 212 614 723 1094 3960 4291 6228 6375 6823

DETERMINATION OF URANIUM BY FISSION TRACK OR FISSION FRAGMENT COUNTING

492 7975

DISCUSSION OF SAMPLING, PROBLEMS OF CONTAMINATION OR LOSS OF MATERIAL BY ABSORPTION ON CONTAINER WALLS

235 475 614 1094 1395 1945 2848 4255 4291 5873 6375

GENERAL REVIEWS

164 409 1874 5387

GROUP SEPARATIONS

5771

MULTIELEMENT ANALYSIS WITH GE(LI) OR MULTIPARAMETER DETECTORS

4381 6375 6455 6936 6969 7935 8140 8141 8146 8147 8148 8196

PHOTON ACTIVATION ANALYSIS

6843

PRECONCENTRATION OF SEAWATER SAMPLES

422 586 614 723 1127 1385 1945 2984 3960 4219 4255 4291
5777 5873 6348 8074 8140

REMOTE IN SITU ANALYSIS

204 961 8018

STABLE TRACERS

5746

NBS TECHNICAL PUBLICATIONS

PERIODICALS

JOURNAL OF RESEARCH reports National Bureau of Standards research and development in physics, mathematics, chemistry, and engineering. Comprehensive scientific papers give complete details of the work, including laboratory data, experimental procedures, and theoretical and mathematical analyses. Illustrated with photographs, drawings, and charts.

Published in three sections, available separately:

- **Physics and Chemistry**

Papers of interest primarily to scientists working in these fields. This section covers a broad range of physical and chemical research, with major emphasis on standards of physical measurement, fundamental constants, and properties of matter. Issued six times a year. Annual subscription: Domestic, $9.50; foreign, $11.75*.

- **Mathematical Sciences**

Studies and compilations designed mainly for the mathematician and theoretical physicist. Topics in mathematical statistics, theory of experiment design, numerical analysis, theoretical physics and chemistry, logical design and programming of computers and computer systems. Short numerical tables. Issued quarterly. Annual subscription: Domestic, $5.00; foreign, $6.25*.

- **Engineering and Instrumentation**

Reporting results of interest chiefly to the engineer and the applied scientist. This section includes many of the new developments in instrumentation resulting from the Bureau's work in physical measurement, data processing, and development of test methods. It will also cover some of the work in acoustics, applied mechanics, building research, and cryogenic engineering. Issued quarterly. Annual subscription: Domestic, $5.00; foreign, $6.25*.

TECHNICAL NEWS BULLETIN

The best single source of information concerning the Bureau's research, developmental, cooperative and publication activities, this monthly publication is designed for the industry-oriented individual whose daily work involves intimate contact with science and technology—*for engineers, chemists, physicists, research managers, product-development managers, and company executives.* Annual subscription: Domestic, $3.00; foreign, $4.00*.

NONPERIODICALS

Applied Mathematics Series. Mathematical tables, manuals, and studies.

Building Science Series. Research results, test methods, and performance criteria of building materials, components, systems, and structures.

Handbooks. Recommended codes of engineering and industrial practice (including safety codes) developed in cooperation with interested industries, professional organizations, and regulatory bodies.

Special Publications. Proceedings of NBS conferences, bibliographies, annual reports, wall charts, pamphlets, etc.

Monographs. Major contributions to the technical literature on various subjects related to the Bureau's scientific and technical activities.

National Standard Reference Data Series. NSRDS provides quantitive data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated.

Product Standards. Provide requirements for sizes, types, quality and methods for testing various industrial products. These standards are developed cooperatively with interested Government and industry groups and provide the basis for common understanding of product characteristics for both buyers and sellers. Their use is voluntary.

Technical Notes. This series consists of communications and reports (covering both other agency and NBS-sponsored work) of limited or transitory interest.

Federal Information Processing Standards Publications. This series is the official publication within the Federal Government for information on standards adopted and promulgated under the Public Law 89–306, and Bureau of the Budget Circular A–86 entitled, Standardization of Data Elements and Codes in Data Systems.

CLEARINGHOUSE

The Clearinghouse for Federal Scientific and Technical Information, operated by NBS, supplies unclassified information related to Government-generated science and technology in defense, space, atomic energy, and other national programs. For further information on Clearinghouse services, write:

Clearinghouse
U.S. Department of Commerce
Springfield, Virginia 22151

---

* **Difference in price is due to extra cost of foreign mailing.**

Order NBS publications from:

Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20230

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF COMMERCE